

REMARKS

This Amendment is responsive to the Office Action dated September 26, 2006, in which Claims 1-11 were rejected. Claims 1-6, 8 and 9 have been amended. Accordingly, Claims 1-11 are pending in the application, and are presented for reconsideration and allowance.

Claim 5, which was rejected under 35 U.S.C. 112, second paragraph, has been amended to substitute “whereby” for “such that”, which is believed to address the issue of indefiniteness.

Claims 1-8 and 10 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,512,994 (Sachdeva). Inasmuch as claim 1 is the only independent claim in the application, the remarks will be mainly directed to the rejection of claim 1, with subsidiary attention to certain of the dependent claims.

Sachdeva describes a method and apparatus for producing a three-dimensional model of an orthodontic patient. After obtaining orthodontic data of the orthodontic structure of the patient, the data is processed according to a simple scaling procedure. The process then continues by obtaining at least two orientation reference points relating to the orthodontic structure that will not change, and then mapping the scaled data to a coordinate system based on the orientation reference points. The result is an enhanced three-dimensional digital model of the orthodontic patient.

In contrast, the present application presumes the existence of a three-dimensional model of one or more teeth of a patient, including the candidate(s) for a prosthesis, and additionally makes use of dental radiographs to geometrically describe the vertical alignment of a patient's teeth, which provides the precise curvature data (of the teeth as part of the dental arch). By projecting the x-ray, a fitted curve, an outline of the teeth, or displacement from a horizontally aligned vertical reference onto the 3-D computer representation of the prosthesis (prior to fabrication), the vertical alignment of the arch (as indicated by the size, shape, position and orientation of the teeth) can be confirmed and/or adjusted.

Consequently, unlike Sachdeva, who produces a three-dimensional model of an orthodontic patient, the present application modifies an already existing model of one or more teeth of a patient for purpose of fitting a prosthesis

(see preamble of claim 1, as amended). There is nothing in Sachdeva about fitting a prosthesis such as described in the present application; in rejecting claim 2, the Examiner points to crown 44 in Sachdeva, but this is a reference to a natural part of a tooth (i.e., the part of a tooth that is covered by enamel and projects beyond the gum line), and not to a manufactured substitute for the natural part.

Moreover, the term dental arch is used differently in Sachdeva than in the present application. In Sachdeva, the dental arch appears to be the upper and lower horseshoe-shaped, substantially horizontal orthodontic structure seen, e.g., in FIGS. 1D and 1E of the reference. In the present application, the dental arch refers to “noticeable arch(ing) in the vertical direction as can be seen in particular relative to a gum line 34” (see page 7, lines 12-13), wherein the aforementioned vertical alignment pertains to “the relative vertical position of a patient's teeth as compared to the adjacent teeth” (see page 4, line 7). To minimize confusion on this point, claim 1 has been amended to delete reference to the arch in favor of the above-noted language from the application.

Furthermore, in Sachdeva the simple scaling procedure does not effect any adjustment of the teeth individually as to adjacent teeth, but only as part of an adjustment to the whole orthodontic entity. In order to adjust the shape and mis-alignment of a single tooth (or a group of teeth) that is a candidate for a prosthesis, there is a need for tooth-to-tooth points for a longitudinal examination of the mouth. As can be seen in Figures 1, 3, 4, 6, 7, 9, 11 and 12, the vertical and horizontal mis-alignment of at least three teeth in the 3-dimensional model is determined relative to the digital image obtained from the radiograph – where, e.g., the middle tooth (or teeth) is the candidate for the prosthesis (e.g., a crown or a bridge), as especially shown in FIGS. 11 and 12. This feature has now been incorporated in paragraph (d) of claim 1.

Finally, paragraph (e) of claim 1 has been modified to remove reference to the dental arch and instead indicate adjusting the 3-dimensional model to correct for shape and mis-alignment, thereby producing an adjusted 3-dimensional model of the prosthesis that is corrected for the vertical and horizontal alignment of the teeth adjacent to the prosthesis.

Accordingly, inasmuch as Sachdeva does not disclose or suggest the features described in the preceding paragraphs, claims 1-8 and 10 are believed to be allowable over the art of record.

With regard to the dependent claims 4, 6 and 8, as now amended, there appears to be nothing in Sachdeva that discloses identifying key vertices, centers of mass, or outlines of the teeth in the radiograph and fitting a curve through the vertices or centers of mass, or matching the outlines. The passages cited by the Examiner offer no suggestion for fitting a curve across vertices or centers of mass, or matching outlines, particularly in three or more teeth.

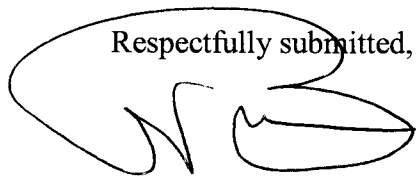
Dependent claims 9 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Sachdeva in view of Rubbert et al. (U.S. patent No. 6,648,640). Since claims 9 and 11 depend from claim 2 and amended claim 1, which is believed to be allowable for reasons as expressed above, dependent claims 9 and 11 should likewise be allowable in view of their dependency.

The remaining references – US 2005/0084144 A1, US Patent No. 6,195,474 and WO 01/80763 – were not relied upon by the Examiner on their merits in relation to the claims but merely considered pertinent to applicant's disclosure. They have been considered for purposes of this response but are at most cumulative and not believed to be otherwise relevant.

It is believed that the claims in the application are allowable over the prior art and such allowance is respectfully requested.

If there are any formal matters remaining after this response, Applicants' attorney would appreciate a telephone call to attend to these matters.

Respectfully submitted,



Attorney for Applicant(s)
Registration No. 29,134

Nelson A. Blish/tmp
Rochester, NY 14650
Telephone: 585-588-2720
Facsimile: 585-477-4646

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.